IN THE UNITED STATES PATENT AND TRADEMARK OFFICE	
In re the application of: BOUET-GRIFFON, Myriam	Attorney Docket No.: 2901683-000026 BR 3565
	Confirmation No.: 6015
Application Serial No.: 10/561,010	Group Art Unit: 1793
Filed: April 18, 2007	Examiner: LEE, Rebecca Y.
For: Autobody Skin Piece Made of an Al-Si-Mg Sheet Metal Alloy and Fixed to a Steel Structure	

APPEAL UNDER 35 U.S.C. § 134

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APPEAL BRIEF

I. Real Party in Interest

Alcan Rhenalu is the real party in interest by virtue of the assignment executed February 23, 2006, February 28, 2006, and April 7, 2006; and recorded at reel/frame number 019177/0463 on April 18, 2007.

II. Related Appeals and Interferences

Appellants are unaware of any appeals or interferences that will directly affect, be directly affected by, or have a bearing on the present appeal.

III. Status of Claims

Claims 1, 3-5, and 7-20 are pending in this application. Claims 2 and 6 are canceled. Claims 1, 3-5, and 7-20 stand rejected by the August 5, 2010 Final Office Action. Following the August 5, 2010 Final Rejection, a Notice of Appeal and Pre-Appeal Brief Request for Review was filed on October 4, 2010. A November 2, 2010 Notice of Panel decision maintained the rejection of claims 1, 3-5, and 7-20.

IV. Status of Amendments

No amendments have been filed subsequent to the August 5, 2010 Final Rejection.

V. Summary of Claimed Subject Matter

Below is a summary of the claims discussed herein with reference to the specification:

A. Claim 1

Independent claim 1 recites: An auto body roof [p. 3, ll. 6-8; p. 3, ll. 14-15; Fig. 2] comprising at least one steel frame [p. 3, ll. 6-8; Fig. 1] and a skin part comprising an aluminium alloy [p. 2. ll. 24-28] attached to the steel frame before painting [p. 3, ll. 6-8], said aluminium alloy comprises a sheet that has been treated by solution, quenching and age-hardening at room temperature [p. 2, ll. 29-30] and said alloy has the following composition in wt%:

Si: 0.7-1.3 [p. 2, l. 27], Fe < 0.5 [p. 2, l. 27], Cu: 0.8-1.1 [p. 2, l. 27], Mn: 0.4-1.0 [p. 2, l. 27], Mg: 0.6-1.2 [p. 2, l. 27], Zn < 0.7 [p. 2, l. 27], Cr < 0.25 [p. 2, l. 27], Zr+Ti < 0.20 [p. 2, l. 28], other elements < 0.05 each and < 0.15 total [p. 2, l. 28], remainder aluminium [p. 2, l. 28], wherein after solution treatment, quenching and age-hardening for three weeks at room temperature [p. 2, ll. 29-30], said sheet has a yield strength $R_{0,2}$ of less than 170 MPa [p. 2, l. 30] and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa [p. 2, l. 31 – p. 3, l. 2].

B. Claim 3

Dependent claim 3 recites: Body roof according to claim 1, wherein said skin part has a high temperature yield strength, at the end of a paint baking heat treatment greater than 200 MPa [p. 4, ll. 1-5].

C. Claim 4

Dependent claim 4 recites: Body roof according to claim 1 wherein the low temperature yield strength, after paint baking, of the skin part is greater than 220 MPa [p. 4, ll. 11-13].

D. Claim 11

Independent claim 11 recites: Auto body part comprising at least one part made of steel [p. 3, ll. 6-8; Fig. 1] and at least one skin part made of an aluminum alloy [p. 2. ll. 24-28] attached to the steel part before painting [p. 3, ll. 6-8], the aluminum part comprises a sheet treated by solutionizing, quenching and age-hardening at room temperature [p. 2, ll. 29-30], said sheet having the following composition in wt %:

Si: 0.7-1.3 [p. 2, l. 27], Fe < 0.5 [p. 2, l. 27], Cu: 0.8-1.1 [p. 2, l. 27], Mn: 0.4-1.0 [p. 2, l. 27], Mg: 0.6-1.2 [p. 2, l. 27], Zn < 0.7 [p. 2, l. 27], Cr < 0.25 [p. 2, l. 27], Zr+Ti < 0.20 [p. 2, l. 28], other elements < 0.05 each and < 0.15 total [p. 2, l. 28], remainder aluminum [p. 2, l. 28], and wherein after solution treatment, quenching and age-hardening for three weeks at room temperature [p. 2, ll. 29-30], said sheet has a yield strength $R_{0,2}$ of less than 170 MPa [p. 2, l. 30] and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa [p. 2, l. 31 – p. 3, l. 2].

E. Claim 12

Dependent claim 12 recites: An auto body part according to claim 11, comprising a body roof [p. 3, ll. 6-15].

F. Claim 13

Dependent claim 13 recites: Auto body part according to claim 11 wherein the aluminum alloy part is a body roof [p. 3, ll. 6-15].

G. Claim 14

Independent claim 14 recites: Auto body skin part made of a sheet metal having a thickness of between 0.8 and 1.2 mm [p. 2, ll. 24-26], said part having the following composition (% by weight): Si: 0.7-1.3 [p. 2, l. 27], Fe < 0.5 [p. 2, l. 27], Cu: 0.8-1.1 [p. 2, l. 27], Mn: 0.4-1.0 [p. 2, l. 27], Mg: 0.6-1.2 [p. 2, l. 27], Zn < 0.7 [p. 2, l. 27], Cr < 0.25 [p. 2, l. 27], Zr+Ti < 0.20 [p. 2, l. 28], other elements < 0.05 each and < 0.15 total [p. 2, l. 28], remainder aluminum [p. 2, l. 28], wherein, after solution treatment, quenching and age-hardening for three weeks at room temperature [p. 2, ll. 29-30], said part has a yield strength $R_{0.2}$ of less than about 160 MPa [p. 2, l. 31 – p. 3, l. 2].

H. Claim 15

Dependent claim 15 recites: A part according to claim 14, wherein the high temperature yield strength thereof at the beginning of said part being subjected to a paint baking heat treatment after a temperature rise, is greater than about 160 MPa [p. 2, l. 31 – p. 3, l. 2].

I. Claim 16

Dependent claim 16 recites: A part according to claim 14, having a high temperature yield strength at the end of being subjected to a paint baking heat treatment is greater than about 200 MPa [p. 4, ll. 1-5].

J. Claim 17

Dependent claim 17 recites: A part according to claim 14, having a low temperature yield strength after being subjected to a paint baking treatment that is greater than about 220 MPa [p. 4, ll. 11-13].

K. Claim 20

Dependent claim 20 recites: An auto body part of claim 19 comprising at least part of an auto roof [p. 3, ll. 6-15].

VI. Grounds of Rejection to be Reviewed on Appeal

(1) Whether claims 11 and 14-19 are patentable under 35 U.S.C. §103(a) over JP 2002-371333 ("Sato").

(2) Whether claims 1, 3-5, 7-10, 12, 13, and 20 are patentable under 35 U.S.C. §103(a) over Sato in view of U.S. Patent No. 6,678,936 ("Izumi").

VII. Argument

A. Introduction and Summary of Argument

Neither of the two grounds of rejection establishes a *prima facie* case of obviousness for the instant claims, and in any event clear evidence of unexpected results has been provided. The deficiencies of each ground of rejection are discussed below. The claims do not stand or fall together, but certain of the claims are patentable for the various reasons set forth herein. Indeed, each of the claims stands or falls separately.

Claims 1, 11, and 14 are independent claims. Sato and the combination of Sato and Izumi are alleged to render obvious these claims. However, Appellants respectfully disagree for at least the reasons set forth below in sections VII.B and VII.C. These sections demonstrate that Sato and Izumi fail to teach or suggest the following:

(1) "solution treatment, quenching and age-hardening for three weeks at room temperature" as required in each of claims 1, 11, and 14;

(2) "a yield strength $R_{0,2}$ of less than 170 MPa" as required in claims 1 and 11;

(3) "a yield strength $R_{0,2}$ of less than about 160 MPa" as required in claim 14; and

(4) "a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa" as required in claims 1 and 11.

At least because of these deficiencies, a *prima facie* case of obviousness for claims 1, 11, and 14, and the claims that depend therefrom, has not been established.

B. Rejection of Claims 11 and 14-19 Under 35 U.S.C. §103(a) Over Sato

1. Sato does not teach or suggest the auto body parts of claim 11.

(a) The broad composition ranges of Sato do not teach or suggest selecting the claimed composition ranges to achieve alloys with the physical properties claimed in claims 11 and 14-19.

Independent claim 11 recites, *inter alia*, "a sheet treated by solutionizing, quenching and age-hardening at room temperature" and "said sheet has a yield strength $R_{0.2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa."

The examiner does not allege that Sato teaches the feature "treated by solutionizing, quenching and age hardening at room temperature," but instead alleges that this feature is a process limitation and therefore fails to give it any weight.[1] Appellants respectfully disagree with this approach and assert that these features, which are not alleged by the Examiner to be taught in Sato, further distinguish the claims from the teachings of Sato. Indeed, these terms should be considered as features of the claim. *See Abbot Laboratories v. Sandoz Inc.*, 566 F.3d 1282, 1293 (Fed. Cir. 2009). Moreover, these features are important because they yield advantageous properties which would not be exhibited by the alloys of Sato (*see* section VII.B.1(b) below for a comparison of properties). For example, lower yield strength $R_{0.2}$ before heat treatment improves the drawing formability of parts, while greater high temperature yield strength after temperature rise at the beginning of a paint baking heat treatment (typically 190°C) prevents the aluminum panel from forming aesthetically unacceptable kinks due to the differential thermal expansion between the aluminum panel and the steel frame of the vehicle and the high value (>200MPa) at the end of the paint baking heat treatment leads to improved dent resistance.[2] The Examiner indicated that Sato discloses compositions with ranges that overlap those claimed, but the Examiner has not provided any rationale to explain how or why Sato would lead one of ordinary skill in the art to select the particular composition ranges claimed, treat the alloy as claimed, and/or to obtain the physical properties claimed. The composition of the present invention, compared to the one of Sato, is a clear selection to obtain the claimed properties.

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[1] April 13, 2010 Office Action at page 4.

[2] *See* Specification, 7:14-17 (Dec. 16, 2005).

None of the specific alloys shown by Sato have compositions within the ranges claimed.[3] Nor does Sato provide any teaching or suggestion that an alloy with the claimed properties could be produced. For example, all of the Sato compositions have an Mn content outside the claimed range of 0.4-1.0, and Sato fails to teach or suggest that this range produces yield strengths greater than 200 MPa at the end of heat treatment.[4]

Moreover, the copper content of all the alloys exemplified in Sato is quite low (see table 1) when compared to the claimed range of 0.8 – 1.1 %, so there is very little chance for any of Sato's alloys to satisfy the claimed physical properties. This is because the content of Cu is very important when considering what characteristics an aluminum material will exhibit at high temperature. The same goes for Mn and Mg. That is, even though the broad ranges of Sato will include some of the contents claimed, because all of Sato's exemplified alloys use contents which not meeting the claimed features, the physical properties of alloys of what Sato actually teaches are simply not met.

In reality, the composition of the present invention, when compared to the one of Sato, is a clear selection that was not anywhere taught by Sato. Indeed, this selection is clearly evident for the recited elements:

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[3] *See, e.g.*, Sato (translation) at TABLE 1.

[4] *See, e.g.*, *id.*; *cf.* Specification, 3:29-4:13.

<u>Si</u> 0.7-1.3 (instant claim 1) preferably 0.7-1.0 (instant claim 5)

Compared with: 0.4-1.8 in Sato,

<u>Cu</u> 0.8-1.1 (instant claim 1)

Compared with: 0.1-1.5 in Sato,

<u>Mn</u> 0.4-1.0 (instant claim 1) preferably 0.45-0.6 (instant claim 7)

Compared with: 0.03-1.5 in Sato,

<u>Mg</u> 0.6-1.2 (instant claim 1) preferably 0.6-0.9 (instant claim 8)

Compared with: 0.2-1.6 in Sato,

<u>Zn</u> <0.7 (instant claim 1) preferably 0.1-0.7 (instant claim 9), 0.15-0.3 (claim 10)

Compared to 0.05-6.0 in Sato

The particular effect of copper has been already described in detail in the declaration of Gilles Guiglionda (in paragraphs 18 to 20). The fact that by increasing the Cu concentration one will increase high temperature yield strength (which is a different characteristic than room temperature yield strength) without unduly increasing the forming strength is not suggested at all by Sato. Instead, this was the invention of Appellants. Sato's disclosure is extremely broad and the selection of the specific ranges claimed is patentable thereover, particularly because the ranges claimed demonstrate specific unexpected physical properties which are positively recited in each of the claims on appeal.

In fact, post-KSR, it clear that selection invention patents still continue to issue from the USPTO, typically in the areas of chemistry, pharmaceuticals, and biotechnology. This is primarily because these technological areas are recognized by the courts as unpredictable art fields. See *Eisai Co. v.Dr. Reddy's Labs, Ltd.*, 533 F.3d 1353, 1359 (Fed. Cir. 2008) ("To the extent an art is unpredictable, as the chemical arts often are, KSR's focus on these 'identified, predictable solutions' may present a difficult hurdle because potential solutions are less likely to be genuinely predictable."). Post KSR, the obviousness determination still requires two distinct elements: (1) motivation; and (2) reasonable expectation of success. *Takeda Chem. Indus., Ltd. v. Alphapharm Pty.,Ltd.*, 492 F.3d 1350, 1360 (Fed. Cir. 2007). Failure to proffer sufficient proof of either element

leads to a conclusion of non-obviousness. *Id.* (finding no prima facie obviousness because defendant could not show either motivation to select the inventors' chosen starting compound or any expectation that the inventors' chosen modifications would succeed). Here, we have neither one. First, the prior art being relied upon (Sato) simply does not provide a basis for one skilled in the art to be motivated to choose the specific ranges claimed; nor second, to have reasonably expected success in obtaining the invention as claimed to obtain alloys with the claimed properties. The Board must therefore reverse the Examiner's conclusion that the claims are obvious over Sato.

(b) Sato neither teaches nor suggests the claimed properties of the instant alloys, and indeed, the claimed alloys demonstrate unexpected results.

Claim 11 recites, *inter alia*, an "[a]uto body part comprising at least one part made of steel and at least one skin part made of an aluminum alloy attached to the steel part before painting." Because aluminum expands at a different rate than steel when exposed to elevated temperatures — such as those used in paint baking or electrophoresis steps — aluminum tends to deform during paint baking or electrophoresis. This leads to kinks and other aesthetically and commercially unacceptable deformities.[5]

Appellants showed previously, with the Declaration of Dr. Guiglionda (*see* section IX. Evidence Appendix), that alloys with compositions lying outside the ranges stated for Si, Fe, Cu, Mn, Mg, Zn, Cr, Zr, and Ti do not possess the physical properties required by the instant claims.[6] For example, comparative alloys 6111 and 6016 from the instant specification lie within the ranges of Sato, but not within the ranges of the instant claims. As with other alloys having compositions outside the ranges claimed, alloys 6111 and 6016 do not possess the properties required by the instant claims, as shown by the comparison below:

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[5] *See* Specification, 4:5-13.

[6] *See, e.g.*, Declaration of Guiglionda (Feb. 19, 2010).

	Si	Fe	Cu	Mn	Mg	Zn	Cr	Other	$R_{0.2}$ T4	$R_{0.2}$ electro-phoresis
Instant Claims	0.7-1.3	< 0.5	0.8-1.1	0.4-1.0	0.6-1.2	< 0.7	< 0.25	Zr+Ti < 0.2	< 170	> 160
Sato	0.4-1.8	0.02-0.5	0.1-1.5	0.03-1.5	0.2-1.6	0.05-6.0	0.02-0.5	—		
Comp. Ex. Alloy 6111	0.63	0.11	0.69	0.17	0.78	—	0.07	—	179	159
Comp. Ex. Alloy 6016	1.00	< 0.3	0.13	0.12	0.30	—	0.03	—	97-126	100-128
Inventive Alloy 6056	0.85	0.07	1.0	0.45	0.75	0.16	0.02	—	169	168

Alloy 6111 has yield strength of 179 MPa after three weeks (outside the limit claimed) and of 159 MPa at the beginning of the electrophoresis treatment (outside the limit claimed).[7] While alloy 6016 has yield strength of between 97 and 126 MPa after three weeks (within the limit claimed), at the beginning of the electrophoresis treatment the yield strength is between 100 and 128 MPa (outside the limit claimed).[8]

In contrast, the composition of Alloy 6056 lies within the ranges of the instant claims, and has yield strength after three weeks of 169 MPa, and improved mechanical resistance at 190°C both at the beginning (168 MPa) and at the end (223 MPa) of the electrophoresis treatment, with a 16% increase in yield strength.[9] These unexpected results are commensurate in scope with the claims and what's more, criticality has also been provided. Thus, even if a *prima facie* case of obviousness could be established in view of Sato, which as discussed above, has not been established, it is overcome by the unexpectedly superior qualities of the alloys of claim 11 and its dependent claims.

[7] *See* Specification, 7:11-8:4.

[8] *See id.*

[9] *See id.* at 6:12-8:4.

2. <u>Sato does not teach or suggest the alloys of claims 14 and 15.</u>

(a) The broad composition ranges of Sato do not teach or suggest selecting the claimed composition ranges to achieve alloys with the physical properties as claimed in claims 14 and 15.

Independent claim 14 recites, *inter alia*, that "after solution treatment, quenching and age-hardening for three weeks at room temperature, said sheet has yield strength $R_{0.2}$ of less than about 160 MPa." Claim 15 further recites a "high temperature yield strength thereof at the beginning of said part being subjected to a paint baking heat treatment after a temperature rise, is greater than 160 MPa. As with claim 11, Sato is not alleged to teach "after solution treatment, quenching and age hardening for three weeks at room temperature" and, thus, for this reason alone, claim 14 would not have been rendered obvious. In addition, as with claim 11, these features are important because, for example, lower yield strength $R_{0.2}$ before heat treatment improves the drawing formability of parts, while greater high temperature yield strength after temperature rise at the beginning of a paint baking heat treatment (typically 190°C) prevents the aluminum panel from forming aesthetically unacceptable kinks due to the differential thermal expansion between the aluminum panel and the steel frame of the vehicle and the high value (>200MPa) at the end of the paint baking heat treatment leads to improved dent resistance.[10] The Examiner indicated that Sato discloses compositions with ranges that overlap those claimed, but the Examiner has not provided any rationale to explain how or why Sato would lead one of ordinary skill in the art to select the particular composition ranges claimed, or to seek the physical properties claimed. The composition of the present invention, compared to the one of Sato, is a clear selection to obtain the claimed properties.

None of the alloys shown by Sato have compositions within the ranges recited in claims 14 and 15.[11] Nor does Sato provide any teaching or suggestion that an alloy with the claimed properties could be produced. For example, all of the Sato compositions have Mn content outside the claimed range of 0.4-1.0, and Sato fails to teach or suggest that this range produces yield strengths greater than 200 MPa at the end of heat treatment. Thus, Appellants respectfully submit that the Examiner

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[10] *See* Specification, 7:14-17 (Dec. 16, 2005).

[11] *See, e.g.*, Sato (translation) at TABLE 1.

has not established a *prima facie* case of obviousness for claims 14 and 15, and any other claims depending from claim 14. The Board is therefore respectfully requested to withdraw this rejection.

(b) Sato neither teaches nor suggests the claimed properties and in any event, unexpected results have been demonstrated in regards to the claimed alloys.

Furthermore, the autobody skin parts of claims 14 and 15 have substantial advantages, which Sato fails to teach or suggest. These advantages are described above in section VII.B.1(b) and evidenced by the Declaration of Dr. Guiglionda (*see* section IX. Evidence Appendix). Thus, even if a *prima facie* case of obviousness could be established in view of Sato, which as discussed above, has not been established, it is overcome by the unexpectedly superior qualities of the alloys of the instant claims, and that showing is commensurate in scope with the present claims and also criticality has been fully demonstrated.

3. Sato neither teaches nor suggests the yield strength of claim 16.

Sato nowhere teaches or suggests an alloy wherein, after solution treatment, quenching, and age-hardening for three weeks at room temperature, said alloy has yield strength $R_{0.2}$ of less than about 160 MPa and a high temperature yield strength at the end of being subjected to a paint baking heat treatment of "greater than about 200 MPa" as recited in claim 16. Sato provides no motivation to one of ordinary skill in the art to select alloys within the claimed range to produce alloys with the claimed properties. Thus, Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to claim 16, and respectfully request that the Board withdraw this rejection.

4. Sato neither teaches nor suggests the yield strength of claim 17.

Sato nowhere teaches or suggests an alloy wherein, after solution treatment, quenching, and age-hardening for three weeks at room temperature, said alloy has yield strength $R_{0.2}$ of less than about 160 MPa and a low temperature yield strength after being subjected to a paint baking treatment that is "greater than about 220 MPa" as recited in claim 17. Sato provides no motivation to one of ordinary skill in the art to select alloys within the claimed range to produce alloys with the claimed properties. Thus, Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to claim 17, and respectfully request that the Board withdraw this rejection.

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Consequently, claims 11 and 14-19 are not rendered obvious by Sato. Accordingly, Appellants respectfully request favorable reconsideration and withdrawal of the rejection of claims 11 and 14-19 under 35 U.S.C. § 103.

C. <u>Rejection of claims 1, 3-5, 7-10, 12, 13, and 20 Under 35 U.S.C. §103(a) Over Sato in view of Izumi</u>

1. <u>Sato in view of Izumi does not teach or suggest the alloy of claim 1.</u>

(a) Izumi does not remedy the deficiencies of Sato because it does not teach the claimed yield strengths.

Claim 1 is similar to claims 11 and 14, except that it additionally recites, *inter alia*, "An autobody roof comprising at least one steel frame and a skin part comprising an aluminium alloy attached to the steel frame before painting." Importantly, claim 1 also recites features similar to those discussed above with respect to claims 11 and 14, specifically it recites, *inter alia*, "a sheet that has been treated by solution, quenching and age-hardening at room temperature" and "said sheet has a yield strength $R_{0,2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa." Therefore, for the same reasons set out above, Appellants respectfully submit that Sato does not teach or suggest the alloys of the present claims. Izumi was cited for teaching that "aluminum alloys would be used as a body roof".[12] Thus, Izumi does not add anything to remedy the aforementioned deficiencies of Sato. For example, Izumi does not teach or suggest an alloy with the claimed physical properties. Moreover, Izumi specifically teaches avoiding electrophoresis of said alloys and the elevated temperatures associated with electrophoresis. Appellants respectfully submit that the combination of Sato and Izumi does not establish a *prima facie* case of obviousness for claim 1 or its dependent claims.

(b) The high temperature yield strengths of compositions according to Sato in view of Izumi are less than those of the instant claims.

Further, the proffered combination of Sato and Izumi fails to teach or suggest the properties which are positively recited in each of the rejected claims. That is, independent claim 1 recites, *inter*

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[12] Apr. 13, 2010 Office Action at page 6 (citing Izumi, col. 1:13-23).

alia, that "said sheet has yield strength $R_{0,2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa." These features are simply not met by Sato, and Izumi does not provide for this deficiency. As shown above, Alloy 6111 (whose composition lies within the ranges of Sato, but outside the claimed ranges) has a low temperature yield strength of 179 MPa, which is greater than the claimed range, and a high temperature yield strength of 159 MPa, which is lower than the claimed range. Alloy 6016 (whose composition lies within the ranges of Sato, but outside the claimed ranges) has a low temperature yield strength between 97 and 126 MPa, which is within the claimed range, but its high temperature yield strength is between 100 and 128 MPa, which is below the claimed range. Thus, a *prima facie* case of obviousness cannot be established in view of Sato, Izumi, and the combination thereof, and in fact, the unexpectedly superior properties of the alloys are recited in each of the instant claims.

2. <u>Sato in view of Izumi neither teaches nor suggests the yield strength of claim 3.</u>

Sato nowhere teaches or suggests an alloy wherein, after solution treatment, quenching, and age-hardening for three weeks at room temperature, said alloy has yield strength $R_{0.2}$ of less than 170 MPa and a high temperature yield strength at the end of a paint baking heat treatment of "greater than 200 MPa" as recited in claim 3. Sato provides no motivation to one of ordinary skill in the art to select alloys within the claimed range to produce alloys with the claimed properties. Izumi does not, nor is it asserted to, cure this deficiency because, as described above, it is only asserted for teaching that "aluminum alloys would be used as a body roof".[13] As such, Izumi does not add anything to remedy Sato's deficiencies with respect to the yield strength of claim 3. Thus, Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to claim 3, and respectfully request that the Board withdraw this rejection.

3. <u>Sato in view of Izumi neither teaches nor suggests the yield strength of claim 4.</u>

Sato nowhere teaches or suggests an alloy wherein, after solution treatment, quenching, and age-hardening for three weeks at room temperature, said alloy has yield strength $R_{0.2}$ of less than 170 MPa and a low temperature yield strength after paint baking treatment that is "greater than 220

[13] Apr. 13, 2010 Office Action at page (citing Izumi, col. 1:13-23).

MPa" as recited in claim 4. Sato provides no motivation to one of ordinary skill in the art to select alloys within the claimed range to produce alloys with the claimed properties. As with claim 3, Izumi does not cure the deficiencies of Sato with respect to claim 4's recited yield strength of "greater than 220 MPa" because it is merely asserted to teach the use of the alloys in an autobody roof. Thus, Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to claim 4, and respectfully request that the Board withdraw this rejection.

4. Sato in view of Izumi neither teaches nor suggests the body roof or auto roof of claims 12, 13, and 20.

For at least the reasons stated above, claims 12, 13, and 20, which respectively recite "a body roof," "wherein the aluminum alloy part is a body roof," and "at least part of an auto roof" would not have been obvious in view of Sato and Izumi (claims 12 and 13 depend from claim 11 and claim 20 depends from claim 14). As stated above, Izumi was cited for teaching that "aluminum alloys would be used as a body roof".[14] However, one of ordinary skill in the art would have had no reason to combine the teaching of Sato and Izumi to yield the features of these claims, especially in view of Izumi's teachings with respect to avoiding electrophoresis of said alloys and the elevated temperatures associated with electrophoresis. Thus, Appellants respectfully submit that the Examiner has not established a *prima facie* case of obviousness with respect to claims 12, 13, and 20, and respectfully request that the Board withdraw this rejection.

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Consequently, none of claims 1, 3-5, 7-10, 12, 13, and 20 are rendered obvious by Sato in combination with Izumi. Accordingly, Appellants respectfully request favorable reconsideration and withdrawal of the rejection of claims 1, 3-5, 7-10, 12, 13, and 20 under 35 U.S.C. § 103.

D. Conclusion

For at least the above-described and substantial failures of the references both separately and combined, the instant claims are in condition for allowance. Appellants respectfully request allowance of the claims.

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[14] Apr. 13, 2010 Office Action at page 6 (citing Izumi, col. 1:13-23).

The requisite fee due upon filing of this brief is submitted herewith. Any additional fee is to be charged to Baker Donelson Bearman Caldwell & Berkowitz, PC, Deposit Account No. 50-4254, referencing docket number 2901683-000026.

Respectfully submitted,

BAKER, DONELSON, BEARMAN,
CALDWELL & BERKOWITZ, P.C.

DATED: November 24, 2010

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VIII. Claims Appendix

1. (Previously Presented) An auto body roof comprising at least one steel frame and a skin part comprising an aluminium alloy attached to the steel frame before painting, said aluminium alloy comprises a sheet that has been treated by solution, quenching and age-hardening at room temperature and said alloy has the following composition in wt%:

Si: 0.7-1.3, Fe < 0.5, Cu: 0.8-1.1, Mn: 0.4-1.0, Mg: 0.6-1.2, Zn < 0.7, Cr < 0.25, Zr+Ti < 0.20, other elements < 0.05 each and < 0.15 total, remainder aluminium, wherein after solution treatment, quenching and age-hardening for three weeks at room temperature, said sheet has a yield strength $R_{0,2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa.

2. (Canceled).

3. (Previously Presented) Body roof according to claim 1, wherein said skin part has a high temperature yield strength, at the end of a paint baking heat treatment greater than 200 MPa.

4. (Previously Presented) Body roof according to claim 1 wherein the low temperature yield strength, after paint baking, of the skin part is greater than 220 MPa.

5. (Previously Presented) Body roof according to claim 1 wherein the alloy of the skin part comprises 0.7 to 1% Si.

6. (Canceled)

7. (Previously Presented) Body roof according to claim 1 wherein the alloy of the skin part comprises 0.45 to 0.6% Mn.

8. (Previously Presented) Body roof according to claim 1 wherein the alloy of the skin part comprises 0.6 to 0.9% Mg.

9. (Previously Presented) Body roof according to claim 1 wherein the alloy of the skin part comprises 0.1 to 0.7% Zn.

10. (Previously Presented) Body roof according to claim 9, wherein the alloy of the skin part comprises 0.15 to 0.3% Zn.

11. (Previously Presented) Auto body part comprising at least one part made of steel and at least one skin part made of an aluminum alloy attached to the steel part before painting, the aluminum part comprises a sheet treated by solutionizing, quenching and age-hardening at room temperature, said sheet having the following composition in wt %:

Si: 0.7-1.3, Fe < 0.5, Cu: 0.8-1.1, Mn: 0.4-1.0, Mg: 0.6-1.2, Zn < 0.7, Cr < 0.25, Zr+Ti < 0.20, other elements < 0.05 each and < 0.15 total, remainder aluminum, and wherein after solution treatment, quenching and age-hardening for three weeks at room temperature, said sheet has a yield strength $R_{0,2}$ of less than 170 MPa and has a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa.

12. (Previously Presented) An auto body part according to claim 11, comprising a body roof.

13. (Previously Presented) Auto body part according to claim 11 wherein the aluminum alloy part is a body roof.

14. (Previously Presented) Auto body skin part made of a sheet metal having a thickness of between 0.8 and 1.2 mm, said part having the following composition (% by weight): Si: 0.7-1.3, Fe <

0.5, Cu: 0.8-1.1, Mn: 0.4-1.0, Mg: 0.6-1.2, Zn < 0.7, Cr < 0.25, Zr+Ti < 0.20, other elements < 0.05 each and < 0.15 total, remainder aluminum, wherein, after solution treatment, quenching and age-hardening for three weeks at room temperature, said part has a yield strength $R_{0.2}$ of less than about 160 MPa.

15. (Previously Presented) A part according to claim 14, wherein the high temperature yield strength thereof at the beginning of said part being subjected to a paint baking heat treatment after a temperature rise, is greater than about 160 MPa.

16. (Previously Presented) A part according to claim 14, having a high temperature yield strength at the end of being subjected to a paint baking heat treatment is greater than about 200 MPa.

17. (Previously Presented) A part according to claim 14, having a low temperature yield strength after being subjected to a paint baking treatment that is greater than about 220 MPa.

18. (Previously Presented) A part according to claim 14, comprising 0.7 to 1% Si.

19. (Previously Presented) An auto body part comprising a part according to claim 14 and a steel part.

20. (Previously Presented) An auto body part of claim 19 comprising at least part of an auto roof.

IX. <u>Evidence Appendix</u>

Appendix 1: Declaration of Dr. Gilles Guiglionda, submitted February 19, 2010 – This Declaration was first entered and considered by the Examiner in the April 13, 2010 Non-Final Rejection.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of: Confirmation No.: 6015

Bouet-Griffon *et al.* Group Art Unit: 1793

Application Serial No.: 10/561,010 Examiner: LEE, Rebecca Y.

Filed: December 16, 2005 Attorney Docket No.: 2901683-000026

For: AUTOBODY SKIN PIECE MADE OF AN AL-SI-MG SHEET METAL ALLOY AND FIXED TO A STEEL STRUCTURE

* * * * * *

Declaration of Dr. Gilles GUIGLIONDA

1. My name is Dr. Gilles Guiglionda. I believe I am competent to make this declaration. Unless otherwise stated, all statements herein are made only on the basis of current personal knowledge and belief.

2. I am a French citizen

3. I am fluent in both written and spoken English.

4. I have a PhD degree dated 2003 in Materials Science and Engineering from the French Institut National Polytechnique de Grenoble and Ecole Supérieure des Mines de Saint-Etienne. I have worked in the aluminium industry for over 7 years specializing in sheet products for automotive. I have been working for Alcan and its predecessor companies for more than 10 years. I am one of ordinary skill in the art in this field.

5. I am a co-inventor of the above-identified patent application, U.S. Application No. 10/561,010. I have personal knowledge of all of the subject matter disclosed therein.

6. I have reviewed both U.S. Patent No. 4,082,578 to Evancho *et al.* and the office action dated November 20, 2009 and am familiar with the subject matter disclosed therein.

7. As currently amended, claim 1 of the present application requires that the aluminium alloys have, *inter alia*, yield strength of less than 170 MPa after solution treatment, quenching and age-hardening for three weeks at room temperature. This particular yield strength allows the alloy to be formed relatively easily.

8. Alloys having this yield strength at this point in processing simply are not disclosed by Evancho.

9. Yield strength depends on both the chemical composition and the metallurgical structure, which is influenced by processing conditions such as quenching conditions. Accordingly, a person having ordinary skill in the art could not predict the physical characteristics of one alloy based on an alloy having similar constituents, but different processing steps.

10. The present alloys as claimed have a yield strength below 170MPa <u>after 3 weeks of natural aging</u>. All of the low yield strength values disclosed by Evancho et al. were measured at much less than 3 weeks of natural ageing. As can be seen at example 10 and table 6 of Evancho, the exemplary alloy disclosed therein has yield strength of 17.6 ksi (121 MPa) after one day of aging, but 26.6 ksi (183 MPa) after one week of aging, 27.2 ksi (187.5 MPa) after two weeks of aging, and 28.5 ksi (196.5 MPa) after four weeks of aging. Therefore, the yield strength of the Evancho alloys after three weeks of aging clearly exceeds the requirements of claim 1.

11. Claim 1 presently relates to "An auto body roof comprising at least one steel frame and a skin part comprising an aluminium alloy attached to the steel frame before painting . . . ." Classical aluminium alloys cannot be attached to a steel frame before painting because, under the high temperature of the paint baking step, skins made of aluminium expand at a different rate than the steel frame. Because auto body roofs are linearly fixed to the steel frame at each edge, there are few degrees of freedom available for the aluminium skin to expand more than the steel frame, particularly in areas close to the aluminium-steel junctions. As a result, classical aluminium skins tend to undergo plastic deformation during the paint baking step, leading to kinks and other aesthetically unacceptable deformities. *See, e.g.*, paragraphs [0022] to [0024] and figure 5 of the published application. These troublesome plastic deformations commonly occur when the part is subject to electrophoresis treatment (typically 195°C for 30 min.) or potentially when the part is subjected to long exposures to the sun, especially in hot weather conditions.

12. Many body parts like hoods and doors are not linearly fixed to a steel frame at all edges and therefore have a greater degree of freedom to expand, thereby reducing the amount of plastic deformation that occurs close to the aluminium-steel junctions.

13. As such, differential thermal expansion between aluminum and steel is much more detrimental in the roof section than in other body parts.

14. Accordingly, the present alloys have been formulated to have sufficient high-temperature yield strength to avoid plastic deformation under such conditions. As currently amended, claim 1 of the present application requires the aluminium alloy to have "a high temperature yield strength, at the beginning of a paint baking heat treatment after a temperature rise, of at least 160 MPa". This high yield strength value at high temperature (typically 190°C) prevents the aluminium panel from forming aesthetically unacceptable kinks due to the differential thermal expansion between the aluminium panel and the steel frame of the vehicle.

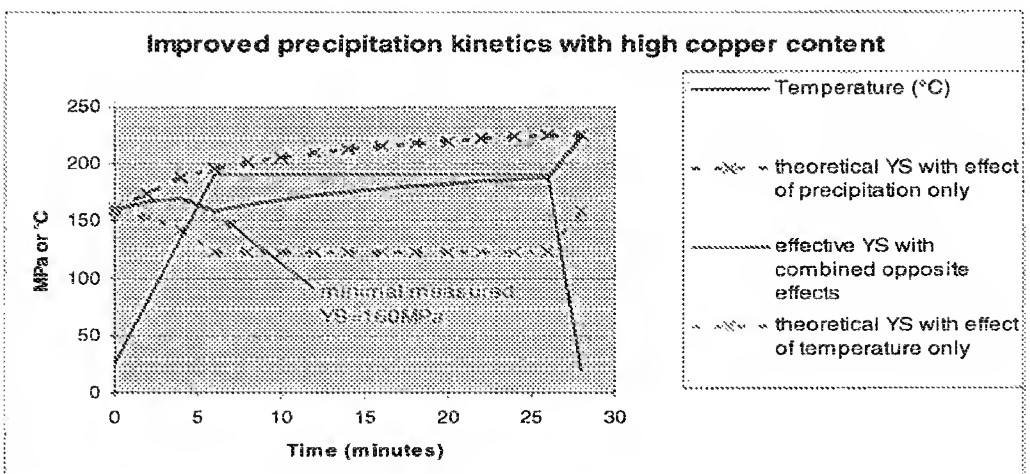
15. As shown at Example 5 of the present application, the use of a classical alloy – such as the ones of Evancho – in a roof would inevitably lead to kinks or other defects as a result of the lack of strength. Example 5 relates in part to a 6111 alloy with composition (in wt%) of 0.63 Si, 0.11 Fe, 0.69 Cu, 0.17 Mn, 0.78 Mg, and 0.07 Cr. This chemical composition is equivalent to the range of the claim 1 of Evancho (with a Mn content of 0.17% versus 0.2% in Evancho). As can be seen at Fig. 2, this alloy does not perform as well as alloy 6056, which falls within the chemical composition claimed by present claim 1. Indeed, the 6111 alloy has a yield strength after three weeks of 179 MPa, which is higher than the upper yield strength limit allowed by claim at this point, but a high temperature yield strength of 159 MPa, which is lower than the minimum limit required by claim 1.

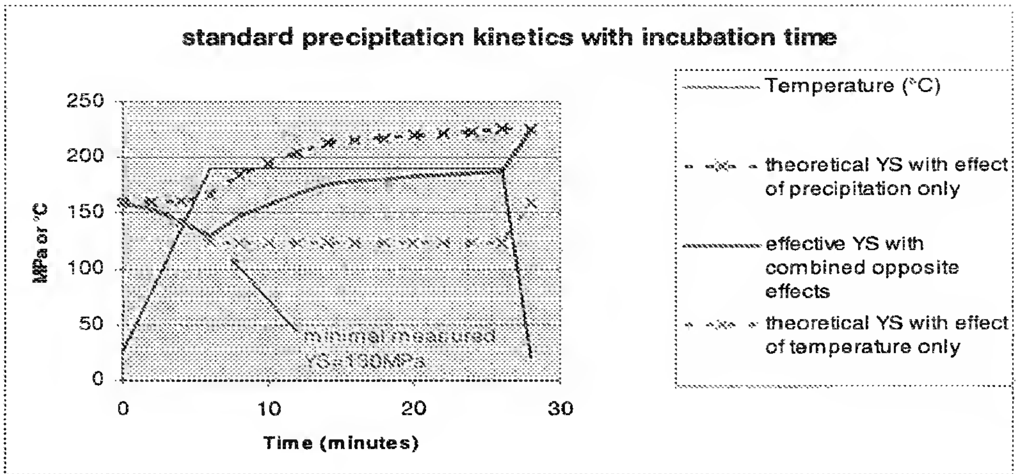
16. Contrary to the Examiner's argument, Evancho *et al.* do not teach that such deficiencies can be overcome simply by increasing the Cu content.

17. Evancho *et al.* are silent regarding the effect of Cu on high temperature yield strength. Moreover, the section of Evancho *et al.* at col. 7, lines 29–44 does not disclose a simple relationship between increased Cu concentration and increased yield strengths. At most, this section states that the presence of Cu in the disclosed amounts increases the spread between the forming and final yield strengths. It does not mean that increases in Cu concentration will increase high temperature yield strength (which is a different characteristic than room temperature yield strength) without unduly increasing the forming strength.

18. Even assuming that Evancho teaches that addition of Cu increases the final yield strength, this is irrelevant to the present claim set. Whether the strength level of the final product is higher or equal or lower will not influence the formation of a kink on the aluminium panel which occurs during or right after the temperature ramp-up. What is relevant to the present claim set is that the addition of Cu increases the yield strength measured at high temperature at the beginning of the paint baking heat treatment *i.e.* during and just after the ramp-up.

19. It has been surprisingly found that addition of higher concentrations of Cu increase high temperature yield strength at this point. Addition of Cu increases the yield strength measured at high temperature first by a solid-solution strengthening and also by increasing the kinetics of precipitation right from the beginning of the heat-treatment. In addition to chemical composition, depending on the processing conditions (such as quenching and pre-tempering treatment), the precipitation during the ramp-up in temperature can have an incubation time of various durations. Lengthened precipitation incubation times would delay the onset of hardening and induce a lower yield strength at high temperature just after the ramp-up. This is demonstrated in the below graphs.





20. Evancho *et al.* simply do not teach that addition of Cu would have any such effect.

21. In addition, a person having ordinary skill in the art could understand Evancho *et al.* at col. 7, lines 29–44 as teaching that Cu in excess of the disclosed amounts is detrimental to formability. It therefore was surprising to observe that sheets made of the alloy 6056, while harder in the T4 temper, have a formability equivalent to that of sheets made of alloy 6016. The recapitulative table attached shows an overlapping between the ranges of the AA 6016 and 6111 and the ones of the alloys of Evancho.

22. In addition, Evancho teaches that a Cu content between 0.25 and 0.50 % is especially imperative because Cu in excess can be detrimental to weldability. Notwithstanding this teaching, the present inventors have found that alloys according to claim 1 can be used to assemble a roof panel with the aluminium alloy being attached to the steel frame by laser welding.

23. Accordingly, a person having ordinary skill in the art would not have been able to predict that the presently-claimed alloys would have both the high temperature yield strength and the forming yield strength as presently claimed based on anything disclosed by Evancho *et al.*

24. I further hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further these statements remain with the knowledge that willful false statements and the like

so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

February 8, 2010 ______________________________

Date Gilles Guiglionda

	Si	Fe	Cu	Mn	Mg	Zn	Cr	R0.2 low T	R0.2 hot before	R0.2 hot after	Others
Claim 1	**0.7 - 1.3**	**< 0.5**	**0.8 - 1.1**	**0.4 - 1.0**	**0.6 - 1.2**	**< 0.7**	**< 0.25**	**< 170**	**> 160**	**> 200**	**Zr + Ti < 0.2**
Example	0.85	0.07	1.00	0.45	0.75	0.16	0.02	146 ou 169	168	223	
Reference 6111	0.63	0.11	0.69	0.17	0.78	No	0.07	179	159	191	
AA 6111	0.6 - 1.1	< 0.4	0.5 - 0.9	0.1 - 0.45	0.5 - 1.0	< 0.15	< 0.1				
AA 6016	0.9 - 1.5	< 0.5	< 0.25	< 0.20	0.2 - 0.6	< 0.20	< 0.1				
Evancho ex 10	1.13	0.18	0.47	0.43	0.78	No	No	28 ksi = 192			Ok
Evancho gen.	0.4 - 1.2	0.05 - 0.35	0.1 - 0.6	0.2 - 0.8	0. 4 - 1.1	< 0.2 pref 0.05		83 - 240			Ti : < 0.10
Evancho outer pref.	0.9 - 1.1	0.1 - 0.3	0.25 - 0.5	0.25 - 0.4	0.7 - 0.9	< 0.05	< 0.05	158 - 206			Ti : < 0.05
Evancho 6151 col 2	0.85	0.48	0.19		0.56	0.2	0.19	Trop dur			

Appendix 1:

Declaration of Dr. Gilles Guiglionda

Submitted to the USPTO on February 19, 2010

X. Related Proceedings Appendix

None.